

1. An apparatus for maintaining data in an electronic storage array during multiple drive failures, the apparatus comprising:

a primary response module configured to recognize a failure of a first drive and enter a first operating mode in response to the failure of the first drive; and

a secondary response module configured to recognize a failure of a second drive and enter a second operating mode in response to the failure of the second drive.

2. The apparatus of claim 1, wherein the primary response module is further configured to place the first drive in an off-line state.

3. The apparatus of claim 1, wherein the secondary response module is further configured to place the second drive in a degraded state.

4. The apparatus of claim 3, wherein the second drive is made accessible for controlled read operations while in the degraded state.

5. The apparatus of claim 1, further comprising a pinned data module configured to store write data on a pinned data drive during employment of the second operating mode.

6. The apparatus of claim 5, wherein the pinned data drive is a system cache of the electronic storage array.

7. The apparatus of claim 5, wherein the pinned data drive is a spare drive of the electronic storage array.

8. The apparatus of claim 5, wherein the pinned data module is further configured to map a first data location on the pinned data drive to a second data location on another drive within the electronic storage array.

9. The apparatus of claim 1, further comprising a recovery module configured to at least partially rebuild data of the first and second drives.

10. The apparatus of claim 9, wherein the recovery module is further configured to at least partially rebuild the data of the first drive on a spare drive of the electronic storage array.

11. The apparatus of claim 9, wherein the recovery module is further configured to at least partially rebuild the data of the second drive using data stored on a pinned data drive.

12. The apparatus of claim 1, further comprising a tracking module configured to create a bad block table and a bad stripe table and store a bad block identifier and a bad stripe identifier in the respective tables, the bad block identifier and bad stripe identifiers identifying the location of suspect data on one of the first and second drives.

13. The apparatus of claim 12, wherein the tracking module is further configured to maintain the bad block identifier and the bad stripe identifier of the location of the suspect data until the data stored in the location is no longer suspect.

14. A system for maintaining data in an electronic storage array during multiple drive failures, the system comprising:

- a storage area network having a storage controller that controls storage of network data on a plurality of storage drives, the plurality of storage derives forming an electronic storage array;

- a primary response module configured to recognize a failure of a first drive of the plurality of storage drives and enter a first operating mode in response to the failure of the first drive and to place the first drive in an off-line state;

- a secondary response module configured to recognize a failure of a second drive of the plurality of storage drives and enter a second operating mode in response to the failure of the second drive and to place the second drive in a degraded state;

- a read module configured to modify a host read command to one of the plurality of storage drives during the employment of the second operating mode;

- a write module configured to modify a host write command to one of the plurality of storage drives during the employment of the second operating mode;

- a pinned data module configured to store write data on a pinned data drive during employment of the second operating mode;

- a recovery module configured to at least partially rebuild data of the first and second drives; and

- a tracking module configured to create a bad block table and a bad stripe table and store a bad block identifier and a bad stripe identifier in the respective tables, the bad block identifier and bad stripe identifiers

identifying the location of suspect data on one of the first and second drives.

15. A process for maintaining data in an electronic storage array during multiple drive failures, the process comprising:

recognizing a failure of a first drive and entering a first operating mode in response to the failure of the first drive; and

recognizing a failure of a second drive and entering a second operating mode in response to the failure of the second drive.

16. The process of claim 15, wherein entering a first operating mode further comprises placing the first drive in an off-line state.

17. A computer readable storage medium comprising computer readable code configured to carry out a process for maintaining data in an electronic storage array during multiple drive failures, the process comprising:

recognizing a failure of a first drive and entering a first operating mode in response to the failure of the first drive; and

recognizing a failure of a second drive and entering a second operating mode in response to the failure of the second drive.

18. The computer readable storage medium of claim 17, wherein entering a first operating mode further comprises placing the first drive in an off-line state

19. The computer readable storage medium of claim 17, wherein entering the second operation mode further comprises placing the second drive in a degraded state.

20. The computer readable storage medium of claim 18, wherein placing the second drive in a degraded state comprises making the second drive accessible for controlled read operations while in the degraded state.

21. The computer readable storage medium of claim 17, further comprising storing write data on a pinned data drive during employment of the second operating mode.

22. The computer readable storage medium of claim 20, wherein storage write data on a pinned data drive comprises storing data on a system cache of the electronic storage array.

23. The computer readable storage medium of claim 20, wherein storage write data on a pinned data drive comprises storing data on a spare drive of the electronic storage array.

24. The computer readable storage medium of claim 20, further comprising mapping a first data location on the pinned data drive to a second data location on another drive within the electronic storage array.

25. The computer readable storage medium of claim 17, further comprising at least partially rebuilding data of the first and second drives.

26. The computer readable storage medium of claim 24, further comprising at least partially rebuilding the data of the first drive on a spare drive of the electronic storage array.

27. The computer readable storage medium of claim 24, further comprising at least partially rebuilding the data of the second drive using data stored on a pinned data drive.

28. The computer readable storage medium of claim 17 further comprising creating a bad block table and storing a bad block identifier and a bad stripe identifier in the respective tables, the bad block identifier and bad stripe identifiers identifying the location of suspect data on one of the first and second drives.

29. The computer readable storage medium of claim of 25 further comprising marinating the bad block identifier and the bad stripe identifier of the location of the suspect data until the data stored in the location is no longer suspect.

30. An apparatus for maintaining data in an electronic storage array during multiple drive failures, the apparatus comprising:

means for recognizing a failure of a first drive and entering a first operating mode in response to the failure of the first drive; and

means for recognizing a failure of a second drive and entering a second operating mode in response to the failure of the second drive.